

01-11-5-4330-230-19

# TM 5-4330-230-12

## TECHNICAL MANUAL

RETURNED TO

OPERATOR AND  
ORGANIZATIONAL MAINTENANCE MANUAL  
INCLUDING

REPAIR PARTS AND SPECIAL TOOL LIST  
FILTER/SEPARATOR, LIQUID FUEL  
15 GPM, ALUMINUM, SKID MOUNTED  
UNITED MODEL NO. 9149  
FSN 4330-490-5370

This reprint includes all changes in effect at the time of  
publication - Changes 1 through 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY  
SEPTEMBER 1970

## **SAFETY PRECAUTIONS**

### **BEFORE OPERATION**

Use care when removing shipping crate members to avoid damaging filter/separator components.

Do not operate the Filter/Separator until the bonding cable on the fuel nozzle has been attached to the vehicle. This bonding must be accomplished prior to the opening of the filler cap. There are no additional grounding requirements for the 15 GPM filter/separator.

Make sure fire extinguishers and fire fighting equipment are available in the immediate area. Provide adequate ventilation before entering an enclosed area.

Rules prohibiting smoking and open flames in the area must be established and strictly enforced. Adequate no smoking signs must be prominently posted.

Rubber gloves must be used when replacing elements due to the toxic effects of some fuel additives.

### **DURING OPERATION**

Make sure fire extinguishers and fire fighting equipment are available in the immediate area. Provide adequate ventilation before entering an enclosed area.

Rules prohibiting smoking and open flames in the area must be established and strictly enforced. Adequate no smoking signs must be prominently posted.

### **AFTER OPERATION**

Make sure fire extinguishers and fire fighting equipment are available in the immediate area. Provide adequate ventilation before entering an enclosed area.

Rules prohibiting smoking and open flames in the area must be established and strictly enforced. Adequate no smoking signs must be prominently posted.

Rubber gloves must be used when replacing elements due to the toxic effect of some fuel additives.

Release pressure prior to removing cover assembly.

System must be depressurized in order to remove any component.

**TM 5-4330-230-12**  
**C 1**

**CHANGE**

**No. 1**

}

**HEADQUARTERS**  
**DEPARTMENT OF THE ARMY**  
**WASHINGTON, D.C., 30 April 1973**

**Operator and Organizational Maintenance Manual**  
**Including Repair Parts and Special Tools List**  
**FILTER/SEPARATOR, LIQUID FUEL, 15 GPM, ALUMINUM,**  
**SKID MOUNTED (UNITED MODEL NO. 9149)**  
**FSN 4330-490-5370**

TM 5-4330-230-12, 26 September 1970, is changed as follows:

*Warning Page.* Inside the front cover, immediately following "SAFETY PRECAUTIONS," the following is added.

**GENERAL**

It is mandatory that the performance of filter/separator on all aircraft refueling equipment be checked every 30 days through the submission of samples taken from the effluent stream of the filter/separators. (See paragraph 6-17, AR 703-1).

*Page C-1.* Appendix C is deleted.

**By Order of the Secretary of the Army:**

**CREIGHTON W. ABRAMS**  
**General, United States Army**  
**Chief of Staff**

**Official:**

**VERNE L. BOWERS**  
**Major General, United States Army**  
**The Adjutant General**

**Distribution:**

To be distributed in accordance with DA Form 12-25A (qty rqr block no. 153), Operator requirements for Petroleum Distribution.

Changes in force: C 1 and C 2

TM 5-4330-230-12  
C 2

CHANGE

No. 2

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C. 29 June 1973

Operator and Organizational Maintenance  
Manual Including Repair Parts and Special Tools Lists  
FILTER/SEPARATOR, LIQUID FUEL 15 GPM,  
ALUMINUM, SKID MOUNTED (ALL MAKES AND MODELS)  
FSN 4330-438-1460

Current as of 21 May 1973

TM 5-4330-230-12, 26 September 1970, is changed as follows:

Cover and title pages are changed as shown above.

Page 1-1. Paragraph 1-1.a, the first sentence, "FSN 4330-490-5370" is changed to read "4330-438-1460".

Paragraph 1-3. The first sentence is changed to read, "No known differences exists within these models".

Page 1-2. Caption for figure 1-1. is changed as follows:

Figure 1-1. Filter/Separator, models 9149 and 050970-23.

Page 1-3. Paragraph 1-4.b(1) after line 3, the following is added in proper tabular order:

Manufacturer	The Bendix Corporation
Model	050970-23
Type	Portable, mechanical

Paragraph 1-4.b(2) Line 10 is changed to read, "Contract No. DAAK01-70-C-0499, and DSA 700-72-C-9094.

Page D-3. Paragraph D-6, manufacturers supply code, "81348", is rescinded.

Page D-12. Section V. In the tabular listing, FSN "4930-360-0737, D-4, and 11" are rescinded, and the following is added in proper nomenclature order.

4330-459-3072	D-4	8
5305-071-2088	D-1	6
5306-484-9795	D-3	14
5310-088-9167	D-4	11

In the tabular listing, reference No. "FF-S-92" is changed to read, "MS51957-85" and "433T-14-2" is changed to read "433T13A".

Page D-5. Line 7 is changed as follows: Col 2, add FSN 5305-071-2088, Col 3, the nomenclature, mfg. code and part no. are changed to read, SIGHT GAGE MOUNTING, (96906) MS51957-85.

Page D-6. Line 19 is changed as follows: Col 2, add FSN 5306-484-9795; Col 3, change mfg. part no. from "433T14-2" to "433T13A".

Page D-7. Line 1 is changed as follows: Col 2, add "FSN 4330-459-3072".

Line 6 is changed as follows: Col 2, "FSN 4930-360-0737", is changed to read, "FSN 5310-088-9167".

By Order of the Secretary of the Army:

**CREIGHTON W. ABRAMS**  
*General, United States Army*  
*Chief of Staff*

Official:

**VERNE L. BOWERS**  
*Major General, United States Army*  
*The Adjutant General*

Distribution:

To be distributed in accordance with DA Form 12-25A (qty rqr block No. 153), Operator requirements for Petroleum Distribution.

CHANGE }  
NO. 3

**Operator and Organizational Maintenance Manual  
Including Repair Parts and Special Tools Lists  
FILTER/SEPARATOR, LIQUID FUEL, 15 GPM,  
ALUMINUM, SKID MOUNTED (ALL MAKES AND MODELS)  
NSN 4330-00-438-1460**

Current as of 8 October 1976

TM 5-4330-230-12, 26 September 1970, is changed as follows:

Page i, content. Change the title of Appendix C to read,

C COMPONENTS OF END ITEMS

LIST..... C-1

Appendix C.1 is added as follows:

C.1. ADDITIONAL AUTHORIZATION

LIST..... C.1-1

Page 1-1, paragraph 1-1a, line 3. "FSN 4330-490-5370" is changed to read, "NSN 4330-00-438-1460".

Paragraph 1-3 is superseded as follows.

### 1-3. Differences Between Models

No known differences exists within these models. Some units contain 1 inch gate valves, other units 1 inch ball valves; however, the valves are interchangeable between all filter/separator units.

### NOTE

These valves are not designed to be serviced: when defective, they should be replaced.

Page 1-3, paragraph 1-4b(1). After last line, add the following:

Manufacturer.....	The Bendix Corporation
Model.....	050970-23
Type.....	Portable, Mechanical
Manufacturer.....	Facet Enterprises, Inc.
Model.....	050970-23
Type.....	Portable, Mechanical

Paragraph 1-4b(2). Delete the following from line 10:

Contract No..... DAAK01-70-C-0499 and  
DSA 72-C-9094

Page 3-1. Section III is superseded as follows.

## Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

### 3-2. General

To insure that the *filter/separator* is ready for operation at all times, it must be inspected systematically so that the defects may be discovered and corrected before they result in serious damage or failure. Defects discovered during operation of the unit shall be noted for future corrections, to be made as soon as an operation has ceased. Stop operation which would damage the equipment if operation were to continue. All deficiencies and shortcomings shall be recorded together with the corrective action taken on DA Form 2404, "Equipment Inspection and Maintenance Worksheet", at the earliest opportunity. When performing your "Before Operation" (B) and "During Operation" (D) PMCS, always keep in mind the CAUTIONS and WARNINGS. After operation, be sure to perform your (A) PMCS.

### 3-3. Preventive Maintenance Checks and Services

Refer to table 3-1 for preventive maintenance checks and services.

a. *Item Number Column.* Checks and services are numbered in chronological order regardless of interval. This column will be used as a source of item numbers for the "TM Item Number" column on DA Form 2404 in recording results of PMCS.

b. *Interval Columns.* The columns headed "B", "D", "A", "W", and "M", will contain a dot (•) opposite the appropriate check indicating it is to be performed Before, During, After, Weekly, or Monthly.

c. *Combat Operability Column.* A dot (•) in the "C" column will identify combat operability checks for unit readiness reporting purposes.

d. *Item to be Inspected Column.* The items listed in this column are divided into groups and identifies the items to be inspected.

e. *Procedures Column.* This column contains a brief description of the procedure by which the check is to be performed.

f. *Equipment will be Reported Not Ready (RED) Column.* This column will contain the criteria which will cause the equipment to be classified as not ready

(RED) because of inability to perform its primary mission.

### NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shutdown.

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

Table 6-1. Operation Crew's Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order list

B—Before

D—During

A—After

W—Weekly

M—Monthly

C—Combat Operability Checks

Item No.	Interval						Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment will be reported Not Ready (Red) if:
	B	D	A	W	M	C			
1	•	•			•		Sight gage	Check for leaks, cracked or broken glass, and loose bolts.	
2	•				•		Valves	Check that valves operate freely and that handles are not bent or broken.	
3	•				•		Connections and gaskets	Check for leaks and that gaskets are not damaged.	
4	•	•					Vent Valve	Check to insure it operates freely, and the wing nuts are not bent.	
5						•	Skid and tank	Check for loose and missing bolts, nuts, and for dents, bent, cracked or broken parts.	
6			•				Dust cap and plugs	Check to insure they are in place after operation.	

Page C-1. Appendix C is superseded as follows.

## APPENDIX C COMPONENTS OF END ITEMS LIST

### Section I. INTRODUCTION

#### C-1. SCOPE

This appendix lists Integral Components of and Basic Issue Items (BII) for the filter/separator to help you inventory items required for safe and efficient operation.

#### C-2. GENERAL

The components of end item list are divided into the following sections:

a. *Section II — Integral Components of the End Item.* Not Applicable.

b. *Section III — Basic Issue Items.* These are minimum essential items required to place the filter/separator in operation, to operate it and to perform emergency repairs. Although shipped separately packed, they must accompany the filter/separator during

operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII based on Table(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

#### C-3. Explanation of Columns

a. *Illustration.* This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration on which the item is shown (if applicable).

(2) *Item number.* The number used to identify item called out in the illustration.



b. **National Stock Number (NSN).** Indicates the national stock number assigned to the end item which will be used for requisitioning.

c. **Part Number (P/N).** Indicates the primary number used by the manufacturer which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements to identify an item or range of items.

d. **Description.** Indicates the federal item name and, if required, a minimum description to identify the item.

e. **Location.** The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. **Usable on Code.** "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in this list are:

**CODE** **USED ON**  
Not Applicable

g. **Quantity Required (Qty Reqd).** This column lists the quantity of each item required for a complete major item.

h. **Quantity.** This column is left blank for use during inventory. Under the received column, list the quantity you actually receive on your major item. The date columns are for use when you inventory the major item at a later date, such as for shipment to another site.

### Section III. BASIC ISSUE ITEMS

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) figure no.	(b) item no.	national stock number	part no. & FSCM	description	location	usable on code	qty. reqd	rcv'd	date	date	date
				TM 5-4330-230-12&P Filter/Separator, Liquid Fuel, 15 GPM, Aluminum, Skid Mounted (All Makes and Models)							

Page C.1. Appendix C.1 is added as follows.

## APPENDIX C.1 ADDITIONAL AUTHORIZATION LIST

### Section I. INTRODUCTION

#### C.1-1. SCOPE

This appendix lists additional items you are authorized for the support of the filter/separator.

#### C.1-2. GENERAL

This list identifies items that do not have to accompany the filter/separator and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

#### C.1-3. Explanation of Listing

National stock number, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON" codes are identified as follows:

**Code** **Used on**  
Not Applicable

### Section II. ADDITIONAL AUTHORIZATION LIST

(1) national stock number	(2) description  part number & FSCM	(3)  usable on code	(4)  qty auth
4330-00-983-0998	An overpack kit is shipped with each 15 GPM Filter Separator, NSN 4330-00-438-1460, and consists of the following items:		
5330-00-408-4558	MIL-F-52308 (81349) Element	EA	1
5330-00-235-4716	13217E6624 (97403) Cover, Gasket	EA	1
	13217E5363 (97403) Sight Gage Gasket	EA	1

Page D-3, paragraph D-6. After last line add the following:

90005 . . . . . Facet Filter Products Division  
434 W. Twelve Mile Road,  
Madison Heights, Michigan 48071

By Order of the Secretary of the Army:

Official:

PAUL T. SMITH  
*Major General, United States Army*  
*The Adjutant General*

BERNARD W. ROGERS  
*General, United States Army*  
*Chief of Staff*

Distribution:

To be distributed in accordance with DA Form 12-25A, Operator maintenance requirements for Petroleum Distribution.

TECHNICAL MANUAL }

No. 5-4330-230-12

HEADQUARTERS,  
DEPARTMENT OF THE ARMY  
Washington, D.C., 26 September 1970**OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL INCLUDING  
REPAIR PARTS AND SPECIAL TOOLS LIST****FILTER/SEPARATOR, LIQUID FUEL, 15 GPM, ALUMINUM,  
SKID MOUNTED (UNITED MODEL NO. 9149)  
FSN 4330-490-5370**Current as of 10 September 1970

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# CHAPTER 1

## INTRODUCTION

### Section I. GENERAL

#### 1-1. Scope

a. These instructions are published for the use of Personnel to whom the 15 GPM (Gallons Per Minute) Filter/Separator, FSN 4330-490-5370 is issued. They provide information on the operation and organizational maintenance of equipment. Also included are descriptions of main units and their functions in relationship to other components.

b. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

c. The direct reporting of errors, omissions, and

recommendations for improving this publication by the individual user, is authorized and encouraged. DA Form 2028 (Recommended Changes to Publications) will be used for reporting these improvements. This form may be completed using pencil, pen or typewriter. DA Form 2028 will be completed in triplicate by the individual using the manual. The original and one copy will be forwarded direct to Commanding General U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Blvd., St. Louis, Mo. 63120.

d. Requirements for administrative storage are contained in TM-740-90-1, Administrative Storage.

### Section II. DESCRIPTION AND DATA

#### 1-2. Description

The 15 GPM Filter/Separator, (fig. 1-1), is a vertical, portable unit consisting of an aluminum tank mounted on an aluminum skid. It is a static device, which is installed in a fuel system to remove entrained water and solid contaminants from the fuel. Inlet, outlet and water drain connections are provided. The inlet and outlet connections are identical, manually operated, 1 inch ball valves. The water drain connection is ½ inch manually operated ball valve. Quick

disconnect couplings for 1 inch hose are provided at inlet and outlet connections. A plexiglass sight gage with a ball float inside is mounted on the side of tank to indicate water level in the base of tank. The cover, held in place by four bolts, has a manual pressure vent valve to permit bleeding air from the unit.

#### 1-3. Differences Between Models

All Filter/Separators, Model 9149, are identical.

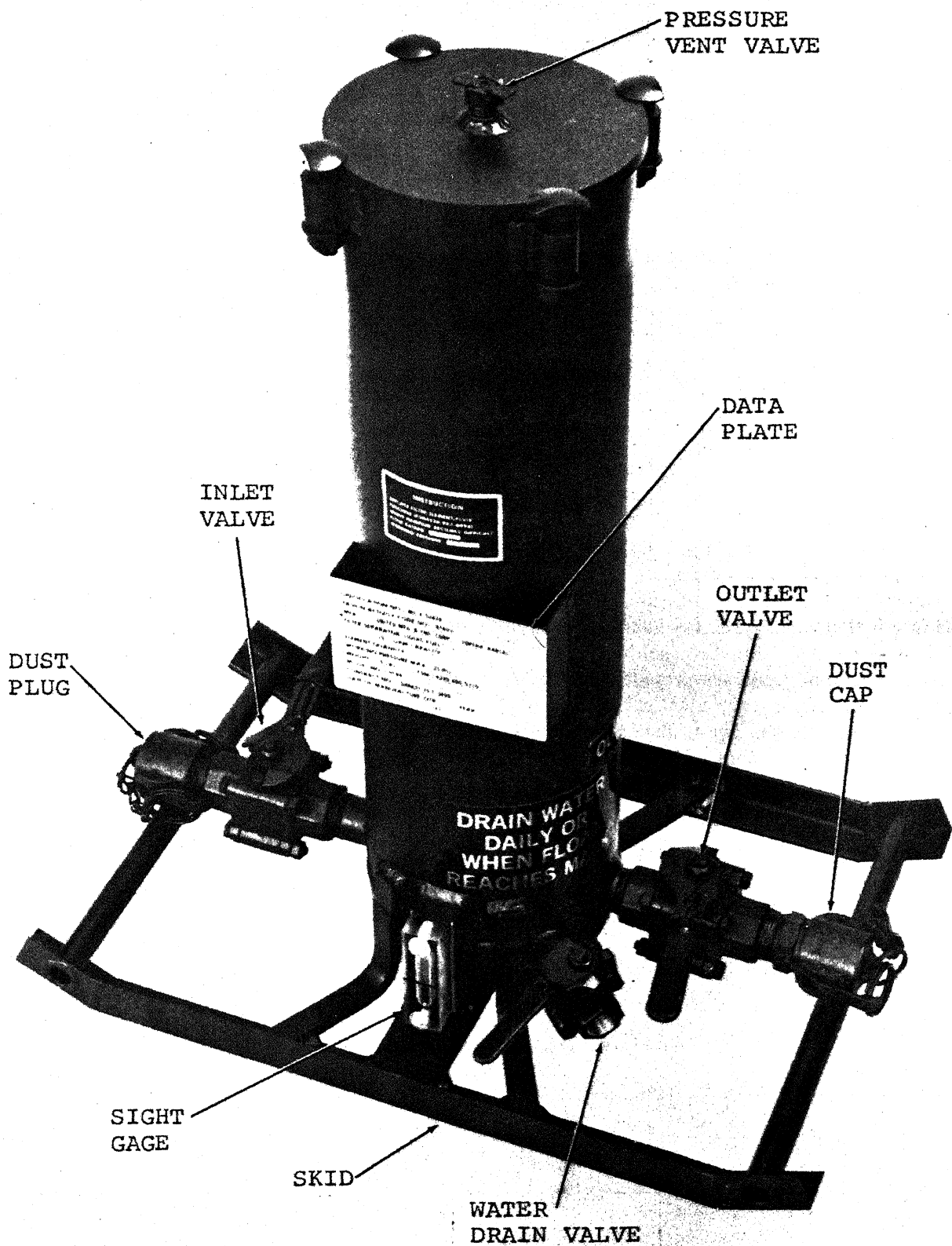


Figure 1-1. Filter/Separator, Model 9149.

1-4. Identification and Tabulated Data

a. Identification. Army Data Plate: The Filter/ Separator has one identification plate located on the side of the tank which specifies the nomenclature, manufacturer, model number and capacity.

b. Tabulated Data.

(1) Distributor.

Manufacturer . . . United Manufacturing & Engineering Corp.  
Model . . . . . 9149  
Type . . . . . Portable, Mechanical

(2) Overall dimensions and weights.

Overall length . . . . . 22.5 inches  
Overall width . . . . . 14 inches  
Overall height . . . . . 27.5 inches  
Net weight empty . . . . . 20 pounds  
Net weight filled . . . . . 44 pounds  
Shipping volume . . . . . 7.5 cu. ft.  
Shipping weight . . . . . 55 pounds  
Flow rate . . . . . 15 GPM  
Working pressure . . . . . 25 PSI  
Contract No. . . . . DAAK01-70-C-0499  
Working temperature range . . . . . +33 to +155 degrees F  
Hydrostatic test pressure . . . . . 62 PSI

## CHAPTER 2

### OPERATING INSTRUCTIONS

#### Section I. SERVICE UPON RECEIPT OF MATERIAL

##### 2-1. Unpacking the Equipment

###### CAUTION

Use care when removing shipping crate members to avoid damaging Filter/Separator components.

- a. Remove the top, side and end members from the base assembly.
- b. Remove all tiedowns and blocking used to secure the Filter/Separator to shipping crate base.
- c. Remove overpack kit from shipping crate.

##### 2-2. Inspecting and Servicing the Equipment

- a. Inspect skid and tank to insure that they have not been bent or damaged.
- b. Inspect the sight gage for cracks or other damage.
- c. Inspect all valves for damage.

##### 2-3. Installation

- a. Select an installation site which will enable the Filter/Separator to be properly installed into the system.
- b. In placing the Filter/Separator in the system, keep it as level as possible to insure proper operation. Block or shim the skid as necessary. Provide a hard surface under the skid to prevent the unit from sink-

ing into soft ground.

c. Make sure that the inlet and outlet hoses are properly connected, securely attached, free of leaks and not kinked.

d. Open the cover by loosening the nuts of the four bolts.

e. Remove cover. Check visually to be sure the canister and element are in place. Replace cover and tighten nuts on the bolts.

###### WARNING

**Do not operate the Filter/Separator until the bonding cable on the fuel nozzle has been attached to the vehicle. This bonding must be accomplished prior to opening the filler cap.**

f. Close inlet and outlet valves, and open manual pressure vent valve, start system pumping unit. Allow Filter/Separator to fill slowly by opening inlet valve slightly.

g. Continue to open inlet valve slowly until fully-open position is reached and fuel flows out the manual pressure vent valve.

h. Close manual pressure vent and check system for leaks, then open outlet valve slowly until fully-open position is reached.

i. During operation, observe all connections and valves for possible malfunction or leaks

#### Section II. MOVEMENT TO A NEW WORKSITE

##### 2-4. Dismantling for Movement

- a. Close inlet and outlet valves (fig. 1-1).

###### WARNING

**Do not drain fuel from unit on the ground. If the unit is not connected to a drain line, drain into a container that can be closed.**

- b. Disconnect the inlet and outlet connections. Drain hoses of residual fuel.
- c. Open the ½ inch water valve drain (fig. 1-1) to drain water and fuel from the Filter/Separator.

d. Open the manual pressure vent valve (fig. 1-1) on top of cover.

e. Close the water drain valve and manual pressure vent valve.

f. Install the dust plug on the inlet opening and the dust cap on the outlet opening.

##### 2-5. Reinstallation After Movement

Inspect, service and install the Filter/Separator as instructed in paragraphs 2-2 and 2-3.

#### Section III. CONTROLS AND INSTRUMENTS

##### 2-6. General

This section describes the various controls and instruments and provides the operator/crew sufficient information to insure proper operation of the Filter/Separator.

##### 2-7. Controls & Instruments

- a. Fuel inlet and outlet valves (fig. 1-1) are identi-

cal, manually operated, 1 inch ball valves.

b. A plexiglass sight gage body and ball float inside indicate the interface between the water and the fuel.

c. The water drain valve is a ½ inch manually operated ball valve and is mounted near the bottom of the Filter/Separator to permit water to be drained from the tank when this becomes necessary.

## Section IV. OPERATION UNDER USUAL CONDITIONS

### 2-8. General

a. The instructions in this section are published for the information and guidance of personnel responsible for the operation of the Filter/Separator.

b. The operator must know how to perform the operations for which the Filter/Separator is designed. This section gives instructions for starting the Filter/Separator. Since nearly every job presents a different problem, the operator may have to vary procedures to fit the individual job.

### 2-9. Starting and Stopping the Filter/Separator

#### a. Starting.

- (1) Make sure that inlet and outlet valves are closed.
- (2) Open manual pressure vent valve.
- (3) Be sure the hoses are connected securely.

(4) Start the system pumping unit.

(5) Open inlet valve slightly to allow the Filter/Separator to fill slowly with as little pressure as possible.

(6) When the unit is completely filled as evidenced by a small amount of fuel emerging from the manual pressure vent valve, close this valve and open the inlet and outlet valves to full open position.

(7) Make a visual inspection of all connections and joints.

#### b. Stopping.

- (1) Stop the system pumping unit.
- (2) Close the inlet and outlet valves.
- (3) Open the manual pressure vent valve.
- (4) Open the water drain valve.
- (5) Close the water drain valve when the tank has drained.

## Section V. OPERATION UNDER UNUSUAL CONDITIONS

### 2-10. General

The instructions in this section are published to provide information and guidance to personnel responsible for the operation of the Filter/Separator under unusual conditions.

### 2-11. Operation in Extreme Cold

a. The Filter/Separator is not equipped with winterization gear. The stopping procedure will be the same as during operation under usual conditions, (para 2-9), except water must be drained through the manual drain valve each time the unit is shut down to prevent freezing of water that has collected in the bottom of the housing. If possible, store in heated shelter.

b. Replace filter element if pumping becomes difficult.

### 2-12. Operation in Extreme Heat

a. Extreme heat, (within the operating temperature range of the equipment) will not adversely affect the operation of the Filter/Separator, except for slightly increasing the internal pressure of the unit and external temperature of the metallic components. Where possible, erect a screen or shelter to provide adequate shade to assist in keeping the surface temperature of the unit within the limits prescribed in (para 1-4).

b. Replace filter element if pumping becomes difficult.

### 2-13. Operation in Dusty or Sandy Areas

a. Dust and sand may require replacement of the

filter element at more frequent intervals. Select a work site by natural shelter or erect screens of dust proof material.

b. Cleanliness should be maintained to keep the unit free of dust and dirt, particularly during intervals when the cover is removed for servicing.

c. Erect a temporary shelter to protect the unit while the cover is removed for servicing.

d. Replace filter element if pumping becomes difficult.

### 2-14. Operation in Rainy or Humid Conditions

a. Rainy or extremely humid conditions may cause unusual amounts of water to be entrained in the fuel. The Filter/Separator is equipped to handle the elimination of most unusual amounts of water, without causing shut down of the fuel discharge valve.

#### NOTE

It is possible for extremely large amounts of water to enter the Filter/Separator causing shut down until the water is eliminated.

b. Erect a shelter to prevent rain from entering the unit while the cover is removed for servicing.

c. Replace the filter element if pumping becomes difficult.

### 2-15. Operation in Salt Water Areas

a. Corrosion prevention can be accomplished by washing or flushing down the external surfaces of the unit regularly with an approved cleaning solvent.

b. Inspect all painted surfaces for cracked, chipped, peeling, or blistered paint. Coat all exterior surfaces in accordance with Military Specification MIL-T-



704 Type A. Color is to be olive drab shade X 24087 of Federal Standard NR 595.

## **2-16. Operation in High Altitudes**

The Filter/Separator is pressurized during normal

operation. Operation in high altitudes will not increase internal pressure beyond the normal limits of the equipment.

## CHAPTER 3

### OPERATOR/CREW MAINTENANCE INSTRUCTIONS

#### Section I. BASIC ISSUE ITEMS

##### 3-1. General

Tools, equipment and repair parts issued or authorized for the Filter/Separator are listed in the basic items list, Appendix C.

#### Section II. LUBRICATION INSTRUCTIONS

Lubrication is not required for the Filter/Separator, 15 GPM and component parts.

#### Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

##### 3-2. General

To insure that the Filter/Separator is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary services to be performed are listed and described in Table 3-1. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during the operation of the unit shall be noted for future correction,

to be made as soon as an operation has ceased. Stop operation which would damage the equipment if operation were to continue. All deficiencies and shortcomings shall be recorded together with the corrective action taken on DA Form 2404 at the earliest opportunity.

##### 3-3. Preventive Maintenance Checks and Services

Refer to Table 3-1 for preventive maintenance checks and services.

Table 3-1. Preventive Maintenance Checks and Services

Item number	Interval				Org.		B — Before operation	A — After operation	M — Monthly
	Operator						D — During operation	W — Weekly	Q — Quarterly
	Daily				M	Q	Item to be inspected	Procedure	Reference
	B	D	A	W					
1	X		X				Filter/Separator	Inspect the Filter/Separator for loose or missing bolts and nuts and for bent, cracked, warped or broken parts. Investigate any unusual operation.	
2	X		X				Valves	Check that valves operate freely and that the handles are not bent or broken.	
3	X		X				Sight Gage	Inspect for leaks.	
4	X		X				Connections	Inspect for leaks.	

#### Section IV. TROUBLESHOOTING

##### 3-4. General

a. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the Filter/Separator and its components

as allocated to operator/crew maintenance.

b. Refer to table 3-2 for troubleshooting information.

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. General Fuel Leakage	a. Torn or worn cover gasket. b. Torn or worn coupling gasket. c. Improperly installed cover.	a. Replace gasket (7 fig. 3-1) b. Replace gasket (32 33 fig. 3-1) c. Refer to para. (20 fig. 3-1)
2. No Fuel Delivery	a. Air trapped in cover b. Valves not open c. Clogged filter element	a. Open pressure vent valve (11 fig. 3-1) b. Open valves ( 12 fig. 3-1) Replace element (2 fig. 3-1)
3. Pumping Difficulty		

## Section V. MAINTENANCE OF FILTER/SEPARATOR

### 3-5. General

The information contained in this section provides information and guidance to the crew/operator to maintain the Filter/Separator.

### 3-6. Sight Gage Inspection

- Inspect the sight gage (fig. 1-1) for cracked body or leaking around gasket.
- If malfunctioning exists, refer to organizational maintenance.

### 3-7. Filter/Separator Assembly Inspection

- Inspect skid and frame for bent or broken member, corrosion and general condition of the paint.
- Refer all deficiencies to organizational maintenance.

### 3-8. Canister and Filter Element Inspection

- Canister (12), (fig. 3-1) and filter element (10) inspection is required to maintain serviceability of the unit.
- Inspect the filter element for clogging or rupture. Inspect the canister for a damaged or clogged screen.

#### WARNING

Depressurize Filter/Separator before removing the cover assembly, by opening the manual pressure vent valve, (1) located in the center of the cover (2).

### 3-9. Disassembly and Removal of the Canister and Filter Element

- Loosen the 4 nuts (3) and washers (4) until each nut is flush with the end of the bolt (5), each bolt can then be raised and rotated 180 degrees so the flanged portion of the bolt head is clear of the cover (2).
- Remove cover and discard the gasket (6).
- Remove the 2 screws (7) and washers (8) and the filter/canister bracket assembly (9).
- Remove filter element (10) from the tank and remove the aluminum plug (11), inspect for clogged or ruptured element. If damaged, replace.

- Remove the canister assembly (12) from the tank.

- Inspect canister for cleanliness and torn mesh. If mesh is torn, replace.

- Remove grommet (13) and standpipe (14) from the canister. Remove grommet from standpipe.

### 3-10. Cleaning of Filter/Separator and Canister Assembly

- Clean inside of the tank by washing with clean fuel.
- Clean canister by washing with clean fuel.

### 3-11. Assembly of Canister and Filter Element

#### CAUTION

Make certain the grommet is properly seated around the canister. The grommet should cover the mesh screen.

- Install the grommet on the standpipe. Place the canister over the standpipe. Press canister into the grommet. Press the canister assembly over the outlet pipe until the grommet is seated to the shoulder of the outlet pipe.

#### NOTE

The outlet pipe is the higher pipe of the two within the tank.

- Install the machined aluminum plug in one end of the filter element. Place the opposite end of the element over the inlet pipe and press down until the bottom makes contact with the shoulder of the inlet pipe.

#### CAUTION

The bracket assembly is not intended to seat on the welded projections inside the housing. Do not attempt to seat the bracket assembly to the projections as this will result in damage to the canister.

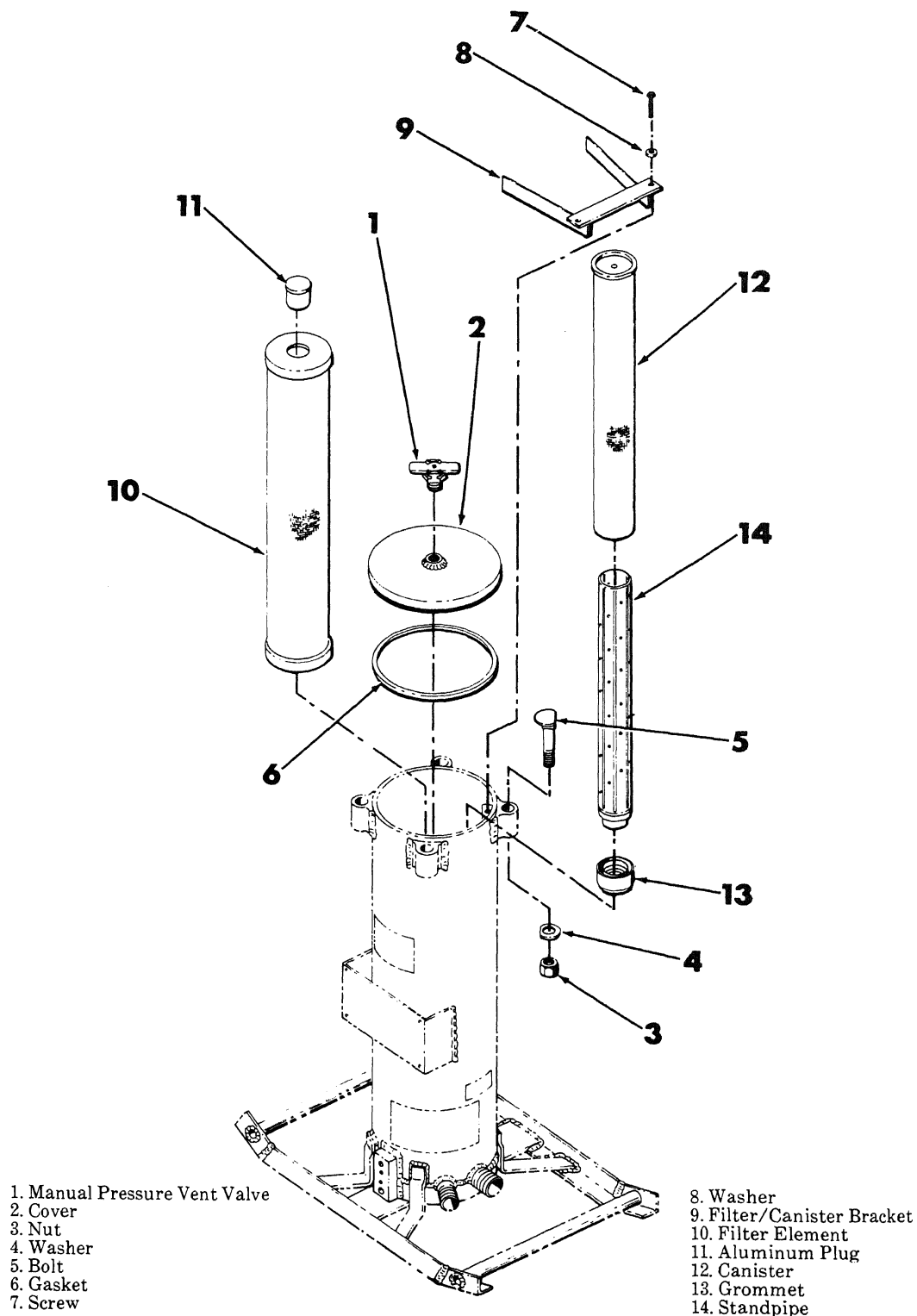
- Position the bracket assembly over the projections inside the tank. Install washers and screws.
- Insert the cover gasket in the groove of the cover.
- Center the cover over the tank.
- Raise the 4 bolts and rotate until the flanged

portion of the bolt head is over the cover. Tighten the nuts uniformly.

**NOTE**

To refill the Filter/Separator, close the manual outlet valve and open the manual pressure vent valve to permit

air to be expelled until the unit is full of fuel. Close the manual pressure vent valve and slowly open the outlet valve. If the filter element has been ruptured, place the outlet hose in the fuel source and recirculate for five minutes to remove any foreign material from the system.



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Figure 3-1. Canister and filter element (exploded view).

# CHAPTER 4

## ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

### Section I. SERVICE UPON RECEIPT OF MATERIAL

#### 4-1. Service Upon Receipt of Material

See Chapter 2, Section I, paragraphs 2-1 and 2-2.

### Section II. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

#### 4-2. Special Tools and Equipment

a. There are no special tools or equipment required to maintain the Filter/Separator.

b. Repair parts are listed in the repair parts list covering organizational maintenance for this equipment in Appendix D of this manual.

### Section III. PREVENTATIVE MAINTENANCE SERVICE

#### 4-3. General

a. To insure that the Filter/Separator is ready for operation at all times, it must be inspected periodically so defects may be observed and corrected before they result in serious damage or failure.

b. The necessary preventive maintenance services to be performed are listed and described in Table 4-1.

Table 4-1. Preventive Maintenance Checks and Services

Item number	Interval							B — Before operation	A — After operation	M — Monthly
	Operator				Org.		D — During operation	W — Weekly	Q — Quarterly	
	Daily				M	Q	Item to be inspected	Procedure	Reference	
	B	D	A	W						
1						X	Filter/Separator	Inspect the Filter/Separator for loose or missing bolts and nuts and for bent, cracked, warped or broken parts. Investigate any unusual operation.		
2						X	Manual Valves	Check for leaks at connections. Be sure the valves do not leak. Check valve for freedom of movement. Replace valve if damaged.		
3						X	Sight Gage	Inspect for leaks. Inspect the sight gage for for cracked or broken leakage around gasket. Tighten loose hardware. Replace sight gage body and damaged body.		
4						X	Connections	Inspect for leaks.		

### Section IV. TROUBLESHOOTING

#### 4-4. General

a. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the Filter/Separator and its components

as allocated to organizational maintenance.

b. Refer to table 4-2 for troubleshooting information.

Table 4-2. Troubleshooting

Malfunction	Probable cause	Corrective action
General Fuel Leakage	<ol style="list-style-type: none"> <li>Cracked weldments on vessel skid assembly</li> <li>Cracked sight gage body</li> <li>Worn sight gage gasket</li> <li>Inlet and outlet valve</li> <li>Worn seals</li> <li>Water drain valve</li> <li>Manual pressure vent valve</li> </ol>	<ol style="list-style-type: none"> <li>Reweld as per para 4-9</li> <li>Refer to (Ch. 4, para 4-7)</li> <li>Refer to (Ch. 4, para 4-11)</li> <li>Replace per (Ch. 4, para 4-15-4-18)</li> <li>Replace per (Ch. 4, para. 4-15-4-18)</li> <li>Refer to (Ch. 4, para 4-12)</li> <li>Replace per (Ch. 4, para 4-15)</li> </ol>

## Section V. MAINTENANCE OF TANK AND SKID

### 4-5. General

The information contained in this section will provide information pertaining to maintenance allocated to organizational functions.

### 4-6. Removal and Disassembly

Refer to Chapter 3, paragraphs 3-9 and 3-10.

### 4-7. Inspection

The Filter/Separator is fabricated from 6061-T6 Aluminum. If the Filter/Separator frame or skid is damaged to the extent that welding is required, the following instructions and recommendations must be used for repairing.

#### WARNING

All flammable vapors and excess fluid must be removed prior to cleaning or welding. Flush and clean the entire Filter/Separator with mixture of 6 oz. of trisodium phosphate, specification 0-T-071, per gallon of water. To agitate the cleaning solution in the vessel, roll, shake or blow air through the solution by means of an air line inserted near the bottom of the Filter/Separator. After cleaning, rinse thoroughly with clean water and air dry.

### 4-8. Cleaning

a. Steam clean or wash all exterior surfaces of the Filter/Separator with a solution of 6 oz. of trisodium phosphate, specification 0-T-071, per gallon of water. After cleaning, rinse thoroughly and dry. Parts may be cleaned more thoroughly by immersing or wiping with cleaning solvent, Federal Specification P-D-680.

b. Inspect all weldments for cracks on skid and tank assembly.

### 4-9. Welding and Repair

#### NOTE

Welding to be performed by experienced aluminum welder only. Clean and prepare the area requiring weld by the following methods in sequence.

Step (1) Chip out old weld or "V" out cracked area and stop drill if necessary.

Step (2) Wash and degrease area with deoxidizing agent and detergent to remove dirt, oil film and oxides.

Step (3) Brush with stainless steel wire brush until all foreign material is removed metal becomes very bright.

### 4-10. Reassembly and Installation

Refer to Paragraph 3-11. Reassemble and install in reverse order.

## Section VI. MAINTENANCE OF SIGHT GAGE

### 4-11. General

a. This gage is a single float ball type sight gage. The body of the gage is a clear plastic material and fastened to the housing with two screws.

b. Refer to (fig. 4-1).

### 4-12. Removal and Disassembly of the Sight Gage

a. Remove the two screws (1) and washers (2) from sight gage body (3).

b. Remove sight gage body and gasket (4) from tank. Discard gasket. Wash all parts in clean fuel.

#### CAUTION

As the sight gage body is removed from the housing, it is possible for the float ball (5) to be dropped from the body and become lost.

### 4-13. Cleaning, Inspection and Repair

a. Wash sight gage ball and body in clean fuel.

b. Check sight gage body for cracks.

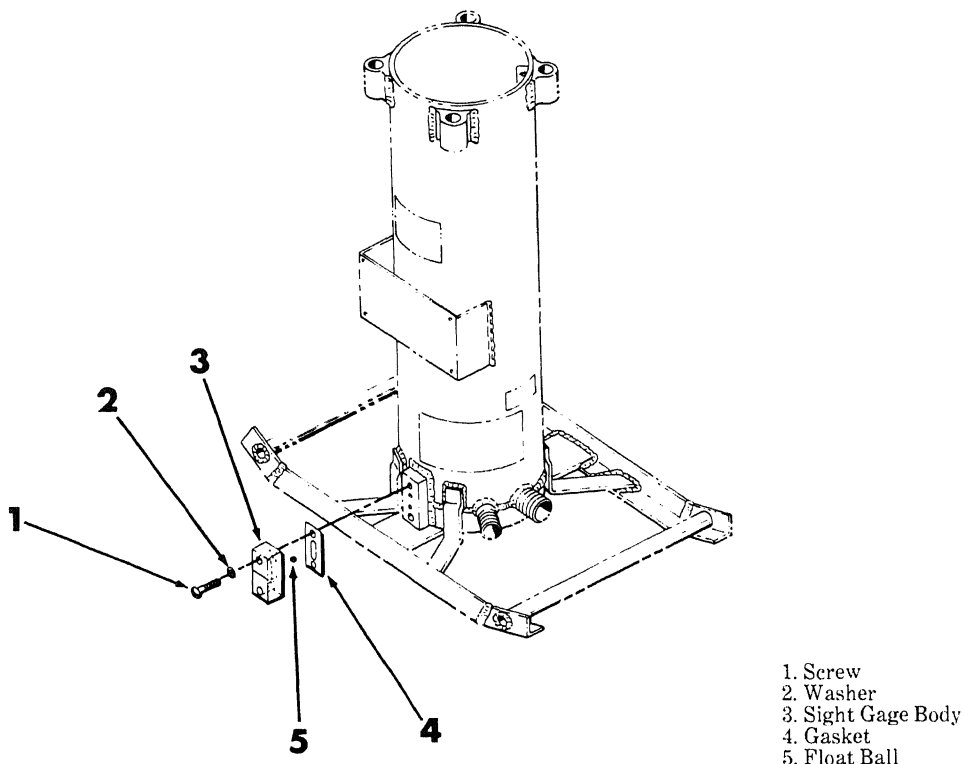
### 4-14. Reassembly and Installation

a. Be sure the sight gage block, (located on the side

of the tank) is clean and free of any deposits that might have been left from the old gasket.

b. Place the 2 washers (2) over screws (1). Insert the screws in the sight gage body (3), place the gasket (4) over the screws, and place the ball (5) in

the sight gage body (3). With the Filter/Separator in an upright position, position the sight gage body on the tank making contact at the bottom first to prevent the ball falling out of the body. Tighten screws.



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Figure 4-1. Sight gage, exploded view.

## Section VII. MAINTENANCE OF INLET AND OUTLET VALVES

### 4-15. General

The inlet and outlet valves are identical components. They are ball type valves having a 90 degree rotation of the handle from the OFF to the ON positions. These valves are designed to permit replacement of the ball and stem seals. Refer to fig. 4-2.

### 4-16. Removal of Inlet and Outlet Valves

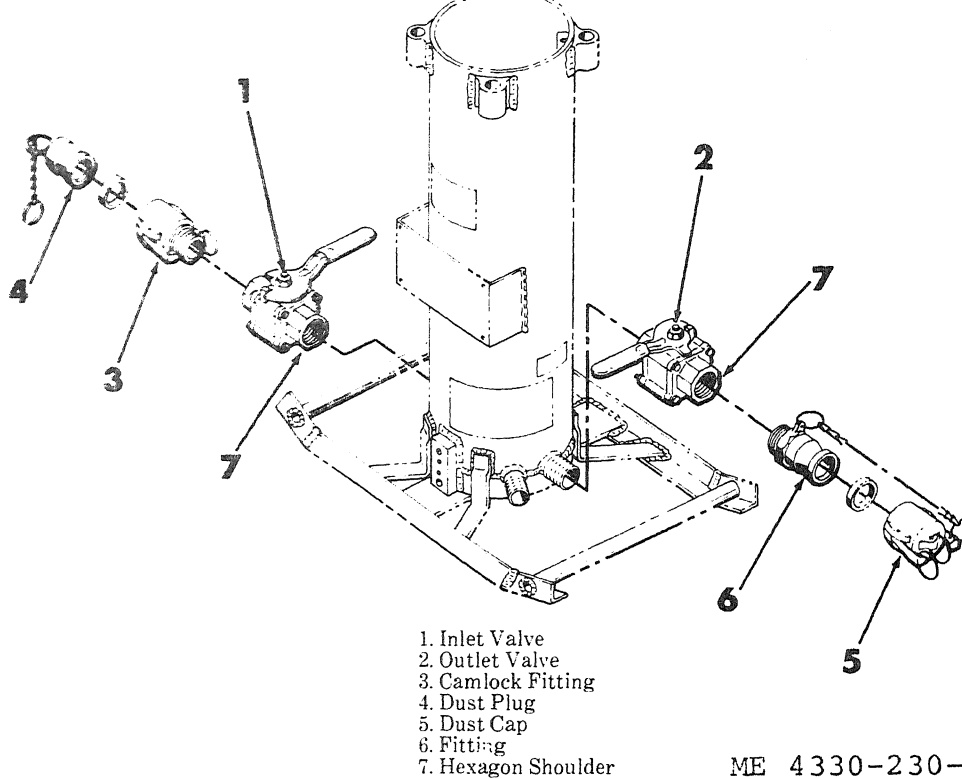
To remove the inlet (1) and outlet (2) valves, disconnect the pump discharge hose from camlock fitting (3) on inlet valve (1), insert dust plug (4) and engage camlocks to prevent dust and foreign material from entering the valve body. Remove Filter/Separator discharge hose from outlet valve (2) and

place the dust cap (5) over the fitting (6) and engage camlocks. With the skid firmly held down, select a wrench of the proper size to fit the octagon shoulder (7) on the valves. Turn the valves counter-clockwise to remove them from the inlet and outlet tubes located on either end of the vessel.

### 4-17. Disassembly of Inlet and Outlet Valves

a. Refer to fig. 4-3.

b. Remove the four bolts (1) and nuts (2). Remove the two pipe ends (3). Remove the two body seals (4). Remove the two seats (5), remove the ball (6) by tipping the bottom of the ball outward to disengage



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Figure 4-2. Inlet and outlet valves.

from the valve stem (7) and permit removal from the body (8).

c. To disassemble the valve stem, remove stem nut (9), remove handle (10) from the valve stem, remove retainer nut (11). Lift off Belleville washers (12), remove stem seal follower (13) and stem seal (14). The valve stem can then be removed from the inside of the body. Thrust bearing (15) should come out with the stem.

#### 4-18. Cleaning, Inspection and Repair

Clean all parts by washing in clean fuel and inspect all components. If any of the seals are scored or torn, replace. Inspect the ball and the valve body for scoring. If either of these components are scored, replace the scored part.

#### 4-19. Reassembly and Installation

a. Place thrust bearing on the valve stem and insert the valve stem into the valve body. Install the

stem seal follower and the stem seal. Install the Belleville washers and the retainer nut.

#### NOTE

Tighten the retainer nut just enough to exert a slight compression on the stem seal.

Install the handle and stem nut and tighten the nut. Check the handle for freedom of movement.

b. To reassemble the valve body, place the ball into the body making certain the groove in the ball seats around the bar on the stem. Install the ball seats and seals. Install the four bolts and nuts and tighten uniformly. Check valve for freedom of movement and install on vessel. Fill the tank with fuel and check for leaks around the valves, inlet and outlet pipes. If leaks exist, tighten the valve on the pipe. If the ball valve leaks around the stem, loosen the stem nut and tighten the retainer nut until leak stops; then tighten the stem nut.

c. Install to tank in reverse order of removal.

### Section VIII. MAINTENANCE OF WATER DRAIN AND MANUAL PRESSURE VENT VALVES

#### 4-20. General

The purpose of the water drain is to permit the crew/operator to remove the water from the Filter/Separator at such time as the water reaches the level line on the sight gage. The manual pressure vent

valve permits the crew/operator to depressurize the Filter/Separator and permits air to escape during the refilling of the unit after maintenance has been accomplished.

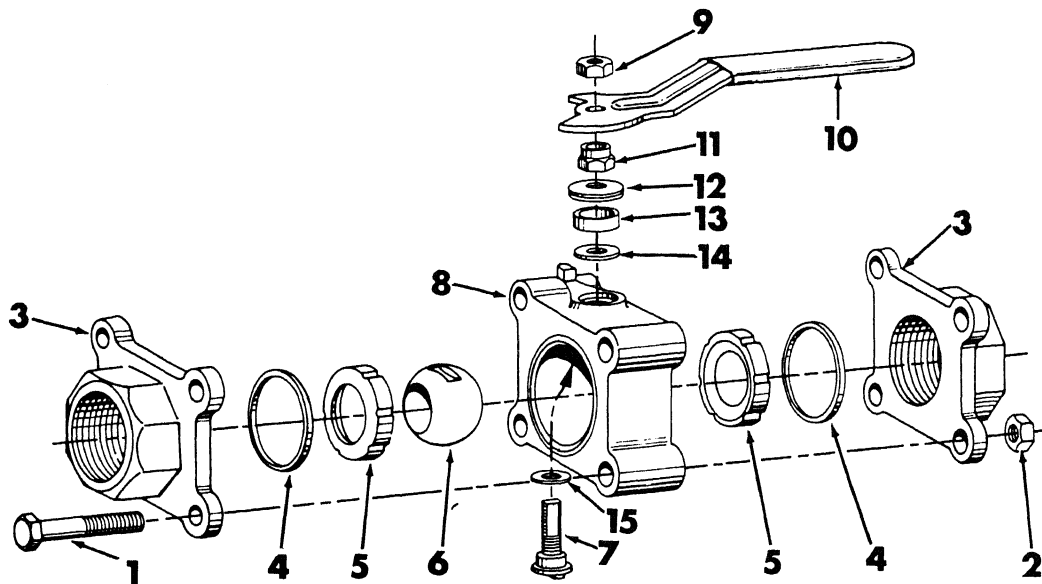


#### 4-21. Water Drain Valve

The water drain valve (fig. 1-1) is similar to the inlet and outlet valves, except it is a  $\frac{1}{2}$ " valve rather than 1". Refer to Paragraphs 4-15 through 4-18 for maintenance instructions.

#### 4-22. Pressure Vent Valve

The manual pressure vent valve (fig. 1-1) requires no maintenance. In case of malfunction, remove and replace.



- |              |                        |
|--------------|------------------------|
| 1. Bolt      | 9. Stem Nut            |
| 2. Nut       | 10. Handle             |
| 3. Pipe End  | 11. Retainer Nut       |
| 4. Body Seal | 12. Belleville Washer  |
| 5. Seat      | 13. Stem Seal Follower |
| 6. Ball      | 14. Stem Seal          |
| 7. Stem      | 15. Thrust Bearing     |
| 8. Body      |                        |

ME 4330-230-12/4-3

Figure 4-3. Inlet and outlet valves; (exploded view).

## **APPENDIX A. REFERENCES**

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### **A-1. Fire Protection**

TB 5-4200-200-10

Hand Portable Fire Extinguishers For Army Users

### **A-2. Painting**

TM 9-213

Painting Instructions for Field Use

### **A-3. Maintenance**

TM 38-750

The Army Maintenance Management System (TAMMS)

### **A-4. Shipment and Storage**

TM 740-90-1

Administrative Storage of Equipment

# APPENDIX B.

## MAINTENANCE ALLOCATION CHART

### Section I. INTRODUCTION

#### B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II (Not Applicable).

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

#### B-2. Explanation of Columns in Section II

a. *Group Number, Column (1).* The assembly group is a numerical group assigned to each assembly in a top down breakdown sequence. The applicable assembly groups are listed on the MAC in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. *Assembly Group, Column (2).* This column contains a brief description of the components of each assembly group.

c. *Maintenance Functions, Column (3).* This column lists the various maintenance functions (A through J) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C — Operator or crew

O — Organizational maintenance

The maintenance functions are defined as follows:

A — INSPECT: To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B — TEST: To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C — SERVICE: To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

D — ADJUST: To rectify to the extent necessary to bring into proper operating range.

E — ALINE: To adjust specified variable elements of an item to bring to optimum performance.

F — CALIBRATE: To determine the corrections to be made in the readings of instruments or test equipment used in precise measurements. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G — INSTALL: To set up for use in an operational environment such as an emplacement, site, or vehicle.

H — REPLACE: To replace unserviceable items with serviceable like items.

I — REPAIR: Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.

J — OVERHAUL: Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

K — REBUILD: The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

d. *Tools and Equipment, Column (4).* This column is provided for referencing by code the special tools and test equipment, (sec III) required to perform the maintenance functions (sec II).

e. *Remarks, Column (5).* This column is provided for referencing by code the remarks (sec IV) pertinent to the maintenance functions.

### B-3. Explanation of Columns in Section IV

*a. Reference Code.* This column consists of two letters separated by a dash, both of which are references to Section II. The first letter references column 5 and second letter references a maintenance func-

tion, column 3, A through J.

*b. Remarks.* This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, Section II.

## Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functions group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
01	VESSEL AND SKID .....	C		C					O	O				A
	COVER AND GASKET .....	C							C					
	GAGE SIGHT .....	C								O				
02	VALVES													
	INLET AND OUTLET .....	C							O	O				
	VALVE WATER DRAIN .....	C							O	O				
	VALVE AIR VENT .....	C							O					
03	ACCESSORIES													
	FILTER ELEMENT .....	C		C					C					
	CANNISTER .....	C		C					C					B
	STAND PIPE .....	C							C					
	COUPLINGS .....	C							C					
	DUST CAP .....	C							C					
	DUST PLUG .....	C							C					
	ATTACHING HARDWARE .....	C							C					

## Section IV. REMARKS

Reference code	Remarks
A-I	Repair includes welding of frame.
B-C	Service includes cleaning with solvent.

# APPENDIX C

## BASIC ISSUE ITEMS LIST

### Section I. INTRODUCTION

#### C-1. Scope

This appendix lists items which accompany the Filter/Separator or are required for installation, operation, or operator's maintenance.

#### C-2. General

This Basic Issue Items List is divided into the following sections:

a. *Basic Issue Items — Section II.* A list of items which accompany the Filter/Separator and are required by the operator/crew for installation, operation, or maintenance.

b. *Maintenance and Operating Supplies — Section III.* A listing of maintenance and operating supplies required for initial operation (Not Applicable).

#### C-3. Explanation of Columns

The following provides an explanation in the tabular list of Basic Issue Items, Section II.

a. *Source, Maintenance, and Recoverability Codes (SMR).*

(1) Source code indicates the source for the listed item. Source codes are:

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.
P2	Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.
M	Applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance levels.
A	Applied to assemblies which are not procured or stocked as such, but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked separately and can be assembled by units at indicated maintenance categories.
X	Applied to parts and assemblies which are not procured or stocked, the mortality of which is normally below that of the applicable end item or component, and the failure of which should result in retirement of the end item from the supply system.
X1	Applied to repair parts which are not procured or stocked, the requirement for which will be filled by use of the next higher assembly or component.
X2	Applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization;

Code	Explanation
G	Applied to major assemblies that are procured with PEMA funds for initial issue only, to be used as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above DS or GS level or returned to depot supply level.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew

(3) Recoverability code indicates whether un-serviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	Explanation
R	Repair parts (assemblies and components which are considered economically repairable at direct and general support maintenance levels. When the maintenance capability to repair these items does not exist, they are normally disposed of at the GS level. When supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 710-50. When so listed, they will be replaced by supply on an exchange basis.
S	Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

b. *Federal Stock Number.* This column indicates the Federal Stock number assigned to the item and will be used for requisitioning purposes.

c. *Description.* This column indicates the Federal item name and any additional description of the item required. The abbreviation "w/e", when used as a part of the nomenclature, indicates the Federal Stock number, includes all armament, equipment, accessories, and repair parts issued with the item. A

part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parenthesis. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

*d. Unit of Measure (U/M).* A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

*e. Quantity Incorporated in Unit.* This column indicates the quantity of the item used in the assembly

group. A "V" appearing in this column in lieu of quantity indicates that a definite quantity cannot be indicated (e.g. shims, spacers, etc.)

*f. Quantity Furnished With Equipment.* This column indicates the quantity of an item furnished with the equipment.

*g. Illustration.* This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Indicates the callout number used to reference the item in the illustration.

## Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock number	(3) Description		(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration	
		<i>Ref No &amp; mfr code</i>	<i>Usable on code</i>				(A) Fig No.	(B) Item No.
PC		DA TECHNICAL MANUAL TM 5-4330-230-12 w/repair parts and special tools		ea	1	1		

# APPENDIX D

## REPAIR PARTS LIST

### Section I. INTRODUCTION

#### D-1. Scope

This appendix lists repair parts, special tools, test and support equipment required for the performance of organizational maintenance of the Filter/Separator.

#### D-2. General

This Repair Parts and Special Tools List is divided into the following sections:

*a. Prescribed Load Allowance (PLA) — Section II.* A composite listing of the repair parts, special tools, test and support equipment having quantitative allowances for initial stockage at the organizational level.

*b. Repair Parts — Section III.* A list of repair parts authorized for the performance of maintenance at the organizational level in figure and item number sequence.

*c. Special Tools, Test and Support Equipment — Section IV.* A list of special tools, test and support equipment authorized for the performance of maintenance at the organizational level (Not Applicable).

*d. Federal Stock Number and Reference Number Index — Section V.* A list of Federal Stock Numbers in ascending numerical sequence followed by a list of reference numbers in ascending alpha-numeric sequence, cross-referenced to the illustration figure number and item number.

#### NOTE

Items not illustrated are cross-referenced to group number.

#### D-3. Explanation of Columns

The following provides an explanation of columns in the tabular lists in sections II, III, and IV:

*a. Source, Maintenance, and Recoverability Codes (SMR).*

#### NOTE

Common hardware items known to be readily available in Army supply channels are assigned Maintenance codes only. Source codes, Recoverability codes, and Maintenance Allowances are not assigned this category.

(1) Source code indicates the selection status and source for the listed item. Source codes are:

Code	Explanation
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.

Code	Explanation
M	Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end item or component. The failure of such part or assembly should result in retirement of the end item from the supply system.
X1	Repair parts which are not procured or stocked. The requirement of such items will be filled by the use of the next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
C	Repair parts authorized for local procurement. Where such repair parts are not obtainable from local procurement, requirements will be requisitioned through normal supply channels accompanied by a supporting statement of nonavailability from local procurement.
G	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above GS and DS level or returned to depot supply level.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
O.....	Organizational Maintenance

(3) Recoverability code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	Explanation
R	Repair parts and assemblies which are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
S	Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.

U Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

*b. Federal Stock Number.* This column indicates the Federal Stock number assigned to the item and will be used for requisitioning purposes.

*c. Description.* This column indicates the Federal item name and any additional description of the item required. Assembly components and subassemblies are indented under major assemblies. The abbreviation "w/e", when used as part of the nomenclature, indicates the Federal Stock number includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parenthesis. Repair parts quantities included in kits and sets are shown in front of the repair part name. Material required for manufacture or fabrication is identified.

*d. Unit of Measure (U/M).* A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

*e. Quantity Incorporated in Unit.* This column indicates the quantity of the item used in the assembly group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g. shims, spacers, etc.).

*f. Fifteen-Day Organizational Maintenance Allowance.*

(1) The allowance columns are divided into four subcolumns. Indicated in each subcolumn opposite the first appearance of each item is the total quantity of items authorized for the number of equipments supported. Subsequent appearances of the same item will have the letters "REF" in the allowance column. To locate the referenced item, locate the FSN or reference number in the index. The earliest figure and item number is the referenced item. Items authorized for use as required but not for initial stockage are identified with an asterisk in the allowance column.

(2) The quantitative allowance for organizational level of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units authorized additional prescribed loads, multiply the number of prescribed loads by the quantity in the appropriate density column to determine the number of repair parts authorized.

(3) To determine allowances when supporting more than 100 of these equipments: First, divide the number of equipments supported by 100 by

moving the decimal two spaces left; second, multiply the result by the quantity in the 51-100 density column. Example; authorized allowance for 51-100 equipment is 40; for 150 equipments, multiply 40 X 1.50 or 60 parts authorized.

(4) Subsequent changes to allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to U. S. Army Mobility Equipment Command for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the U.S. Army Mobility Equipment Command based upon engineering experience, demand data, or TAERS information.

*g. Illustration.* This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Indicates the callout number used to reference the item in the illustration.

#### D-4. Special Information

*a.* Repair parts mortality has been based on 4000 hours of operation per year.

*b.* Parts which require manufacture or assembly at a category higher than that authorized for installation will indicate in the source column the higher category.

#### D-5. How to Locate Repair Parts

*a.* When Federal Stock Number or Reference Number is Unknown:

(1) *First.* Using the table of contents, determine the assembly group within which the repair part belongs. This is necessary since illustrations are prepared for assembly groups and listings are divided into the same groups.

(2) *Second.* Find the illustration covering the assembly group to which the repair part belongs.

(3) *Third.* Identify the repair part on the illustration and note the illustration figure and item number of the repair part.

(4) *Fourth.* Using the Repair Part Listing, find the assembly to which the repair part belongs and locate the illustration figure and item number noted on the illustration.

*b.* When the Federal Stock Number or Reference Number is Known:

(1) *First.* Using the Index of Federal Stock Numbers and Reference Numbers find the pertinent Federal Stock number or reference number. This index is in ascending FSN sequence followed by a list of reference numbers in alpha-numeric sequence, cross referenced to the illustration figure number and item number.



(2) *Second.* Using the Repair Part Listing, find the assembly group of the repair part and the illustration figure number and item number referenced in the Index of Federal Stock Numbers and Reference Numbers.

c. When the Federal Stock Number or Reference Number is Known and the Repair Part is not Illustrated.

(1) *First.* Using the Index of Federal Stock Numbers and Reference Numbers find the pertinent Federal Stock number or reference number in the section titled Item not Illustrated and note the group number. This section of the index is in ascending FSN sequence, followed by a list of reference numbers in alpha-numeric sequence, cross referenced to assembly group number.

(2) *Second.* Using the Table of Contents, locate the assembly group number and page number.

(3) *Third.* Using the applicable group number and page number locate the pertinent stock number or reference number in the Repair Parts Listing. Items which are not illustrated are listed at the end of the assembly group to which they belong.

## D-6. Federal Supply Codes for Manufacturers

01400.....	United Mfg. and Engineering Corp. 1947 N. Topeka Blvd. Topeka, Kansas
81348.....	Federal Specifications General Services Administration Washington, D.C.
81349.....	Military Specifications Naval Publications and Form Center Philadelphia, Pennsylvania
81718.....	O.P.W. Division of Dover Corp. 2735 Colerain Ave. Cincinnati, Ohio
90005.....	Bendix Filter Division 434 W. Twelve Mile Road Madison Heights, Michigan
96906.....	Military Standard Naval Publications and Form Center Philadelphia, Pennsylvania
97403.....	U.S. Army Mobility Equipment Research and Development Center Ft. Belvoir, Virginia
98991.....	Worcester Valve Co., Inc. 18 Parker St. Worcester, Massachusetts 01610

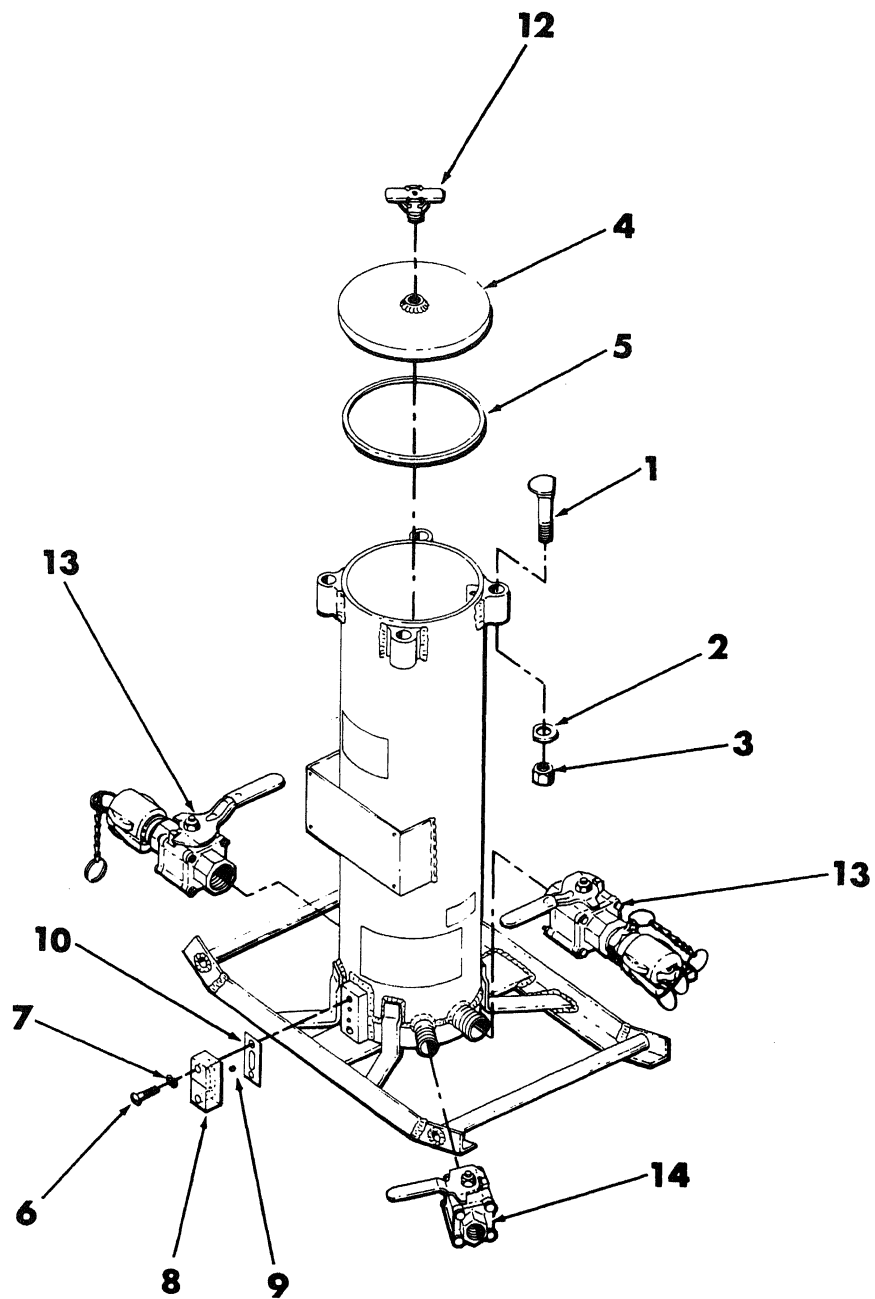
## SECTION II. PRESCRIBED LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	(3) 15-DAY ORGANIZATIONAL MAINTENANCE ALLOWANCE			
		(a) 1-5	(b) 6-20	(c) 21-50	(d) 51-
	USABLE ON CODE				
	GROUP 01 - VESSEL AND SKID ASSEMBLY				
5330-408-4558	GASKET, COVER 13217E6624 (97403)	2	8	11	34
6680-197-4942	BALL 13217E5362 (97403)	*	1	1	2
5330-235-4716	GASKET, WATER GAGE 13217E5363 (97403)	*	1	1	4
	GROUP 02 - VALVES				
5330-265-1078	BODY SEAL MS 29513-127 (96906)	2	4	8	17
	STEM SEAL 119040-7 (01400)	2	2	4	8
5330-250-0224	BODY SEAL MS 29513-20 (96906)	2	2	4	8
	STEM SEAL 119047-7 (01400)	1	1	2	4
	GROUP 03 - ACCESSORIES				
5325-121-8475	GROMMET 13217E6623 (97403)	*	1	2	4
4330-983-0998	ELEMENT, FILTER MIL-F-52308 (81349)	2	8	16	34
4930-360-0737	GASKET, RUBBER 1" MS 27030-3 (96906)	1	2	4	8

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION  REF NUMBER & MFR CODE	(4) UNIT OF MEAS  USABLE ON CODE	(5) QTY INC IN UNIT	(6) 15-DAY ORGANIZATIONAL MAINTENANCE ALW				(7) ILLUS- TRATION	
					(a)	(b)	(c)	(d)	(a)	(b)
					1-5	6-20	21-50	51-100	FIG. NO.	ITEM NO.
		SECTION III REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE								
		GROUP 01 - VESSEL AND SKID ASSEMBLY								
PO	5330-408-9021	BOLT, STEP 13217E6628 (97403)	EA	4	*	*	*	*	D-1	1
PO	5310-809-5998	WASHER, FLAT MS 27183-18 (96906)	EA	4	*	*	*	*	D-1	2
PO	5310-768-0318	NUT, HEX MS 51967-14 (96906)	EA	4	*	*	*	*	D-1	3
PO	4330-197-4975	COVER 13217E6625 (97403)	EA	1	*	*	*	*	D-1	4
PO	5330-408-4558	GASKET, COVER 13217E6624 (97403)	EA	1	2	8	16	34	D-1	5
PO	6680-197-4941	GAGE, SIGHT WATER LEVEL 13217E5360 (97403)	EA	1	*	1	1	2		
PO		SCREW, MACHINE, SLOTTED TYPE 1, STYLE 9s FF-S-92 (81348)	EA	2	*	1	2	3	D-1	6
PO	5310-582-5677	WASHER, FLAT MS 15795-810 (96906)	EA	2	*	*	*	*	D-1	7
X1		BODY 13217E5361 (97403)	EA	1					D-1	8
PO	6680-197-4942	BALL 13217E5362 (97403)	EA	1	*	1	1	2	D-1	9
PO	5330-235-4716	GASKET, WATER GAGE 13217E5363 (97403)	EA	1	*	1	2	4	D-1	10
X		TANK AND SKID ASSEMBLY 13217E6630 (97403)	EA	1					D-1	11
		GROUP 02 - VALVES								
PO	4820-407-2581	VALVE, MANUAL PRESSURE VENT 13216E2798 (97403)	EA	1	*	*	*	*	D-1	12
PO	4820-407-6449	VALVE, BALL TYPE 1" 13207E9044-1 (97403)	EA	2	*	*	*	*	D-1	13
X1		BODY 433T-1 (98991)	EA	2					D-2	1
X1		PIPE END 433T-2 (98991)	EA	4					D-2	2
X1		BALL 433T-3 (98991)	EA	2					D-2	3
X1		STEM 433T-4 (98991)	EA	2					D-2	4
X1		SEAT 433T-5 (98991)	EA	4					D-2	5
PO	5330-265-1078	BODY SEAL MS29513-127 (96906)	EA	4	2	4	8	16	D-2	6
PO		STEM SEAL 119040-7 (01400)	EA	2	1	2	4	8	D-2	7
X1		THRUSTBEARING 433T-8 (98991)	EA	2					D-2	8
X1		STEM SEAL FOLLOWER 433T-9 (98991)	EA	2					D-2	9
X1		BELLEVILLE WASHERS 433T-10 (98991)	EA	2					D-2	10
PO		STEM NUT 433T-11 (98991)	EA	2	*	*	*	*	D-2	11

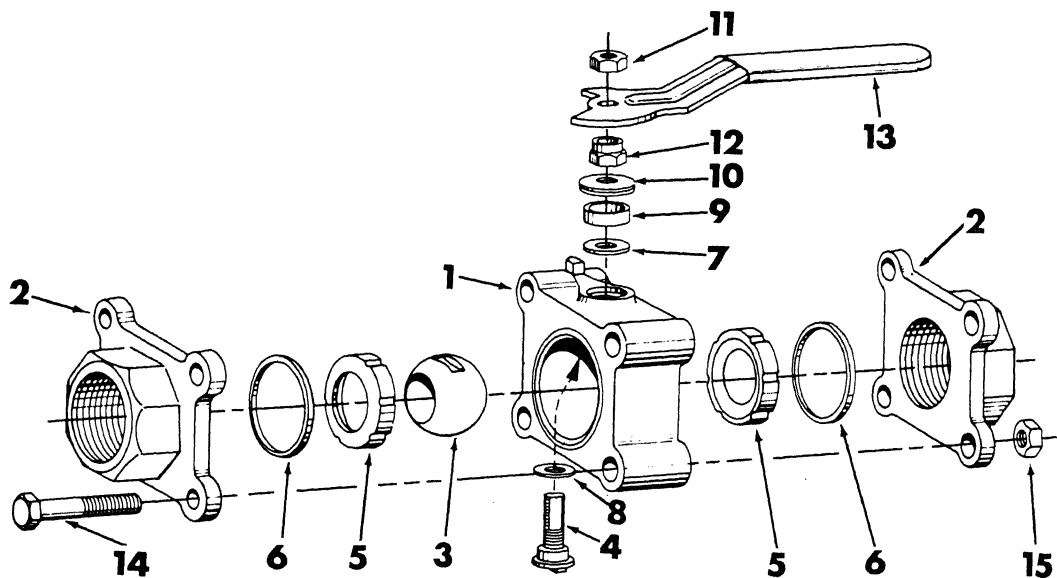
(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION  REF NUMBER & MFR CODE	(4) UNIT OF MEAS  USABLE ON CODE	(5) QTY INC IN UNIT	(6) 15-DAY ORGANIZATIONAL MAINTENANCE ALW				(7) ILLUS- TRATION	
					(a)	(b)	(c)	(d)	(a)	(b)
					1-5	6-20	21-50	51-100	FIG. NO.	ITEM NO.
		GROUP 02 - VALVES (Continued)								
P0		RETAINING NUT 433T-12 (98991)	EA	2	*	*	*	*	D-2	12
X1		HANDLE 433T-13 (98991)	EA	2					D-2	13
P0		BODY BOLT 433T-14 (98991)	EA	8	*	*	*	*	D-2	14
P0		BODY NUT 433T-15 (98991)	EA	8	*	*	*	*	D-2	15
P0	4820-923-9981	VALVE, BALL TYPE, 1/2" NPT 13207E9044-2 (97403)	EA	1	*	*	*	*	D-1	14
X1		BODY 433T-1-2 (98991)	EA	1					D-3	1
X1		PIPE END 433T-2-2 (98991)	EA	2					D-3	2
X1		BALL 433T-3-2 (98991)	EA	1					D-3	3
X1		STEM 433T-4-2 (98991)	EA	1					D-3	4
X1		SEAT 433T-5-2 (98991)	EA	2					D-3	5
P0	5330-250-0224	BODY SEAL MS 29513-020 (96906)	EA	2	2	2	4	8	D-3	6
P0		STEM SEAL 119047-7 (01400)	EA	1	1	1	2	4	D-3	7
X1		THRUSTBEARING 433T-8-2 (98991)	EA	1					D-3	8
X1		STEM SEAL FOLLOWER 433T-9-2 (98991)	EA	1					D-3	9
X1		BELLEVILLE WASHERS 433T-10-2 (98991)	EA	1					D-3	10
P0		STEM NUT 433T-11-2 (98991)	EA	1	*	*	*	*	D-3	11
P0		RETAINING NUT 433T-12-2 (98991)	EA	1	*	*	*	*	D-3	12
X1		HANDLE 433T-13-2 (98991)	EA	1					D-3	13
P0		BODY BOLT 433T-14-2 (98991)	EA	4	*	*	*	*	D-3	14
P0		BODY NUT 433T-15-2 (98991)	EA	4	*	*	*	*	D-3	15
		GROUP 03 - ACCESSORIES AND ATTACHING HARDWARE								
P0	5305-050-9234	SCREW, MACHINE MS 51957-68 (96906)	EA	2	*	*	*	*	D-4	1
P0	5310-993-8120	WASHER, LOCK MS 35338-138 (96906)	EA	2	*	*	*	*	D-4	2
P0	4330-197-4977	BRACKET ASSEMBLY, FILTER AND CANNISTER 13217E6622 (97403)	EA	1	*	*	*	*	D-4	3
P0	4330-197-4976	CANNISTER ASSEMBLY 13217E6631 (97403)	EA	1	*	*	*	*	D-4	4
P0	5325-121-8475	GROMMET 13217E6623 (97403)	EA	1	*	1	2	4	D-4	5

(1)	(2)	(3)	(4)	(5)	(6)				(7)		
SMR CODE	FEDERAL STOCK NUMBER	DESCRIPTION  REF NUMBER & MFR CODE	USABLE ON CODE	UNIT OF MEAS	QTY INC IN UNIT	15-DAY ORGANIZATIONAL MAINTENANCE ALW				ILLUS- TRATION	
						(a)	(b)	(c)	(d)	(a)	(b)
						1-5	6-20	21-50	51-100	FIG. NO.	ITEM NO.
		GROUP 03- ACCESSORIES & ATTACHING HARDWARE (Cont'd)									
PO		STANDPIPE 041315-04 (90005)		EA	1	*	*	*	*	D-4	6
PO	5340-435-5315	PLUG, FILTER 13217E6627 (97403)		EA	1	2	8	16	34	D-4	7
PO	4330-983-0998	ELEMENT, FILTER MIL-F-52308 (81349)		EA	1	2	8	16	34	D-4	8
PO	4730-084-7435	ADAPTOR, 1" NPT MS 27022-5 (96906)		EA	1	*	*	*	*	D-4	9
PO	4730-929-0791	DUST CAP, 1" MS 27028-5 (96906)		EA	1	*	*	*	*	D-4	10
PO	4930-360-0737	GASKET, 1" MS 27030-3 (96906)		EA	2	1	2	4	8	D-4	11
PO	4940-360-0710	COUPLER, 1" NPT MS 27026-5 (96906)		EA	1	*	*	*	*	D-4	12
P.A	4940-360-0715	DUST PLUG MS 27029-5 (96906)		EA	1	*	*	*	*	D-4	13
X2		PLATE, IDENTIFICATION 13217E6629 (97403)		EA	1					D-4	14
X2		PLATE, INSTRUCTION (ELEMENT) 13217E6632 (97403)		EA	1					D-4	15
X2		PLATE, INSTRUCTION (WATER DRAIN) 13216E2768 (97403)		EA	1					D-4	16
X2		PLATE INSTRUCTION (OUTLET) 13216E2766 (97403)		EA	1					D-4	17
X2		PLATE, INSTRUCTION (INLET) 13216E2767 (97403)		EA	1					D-4	18



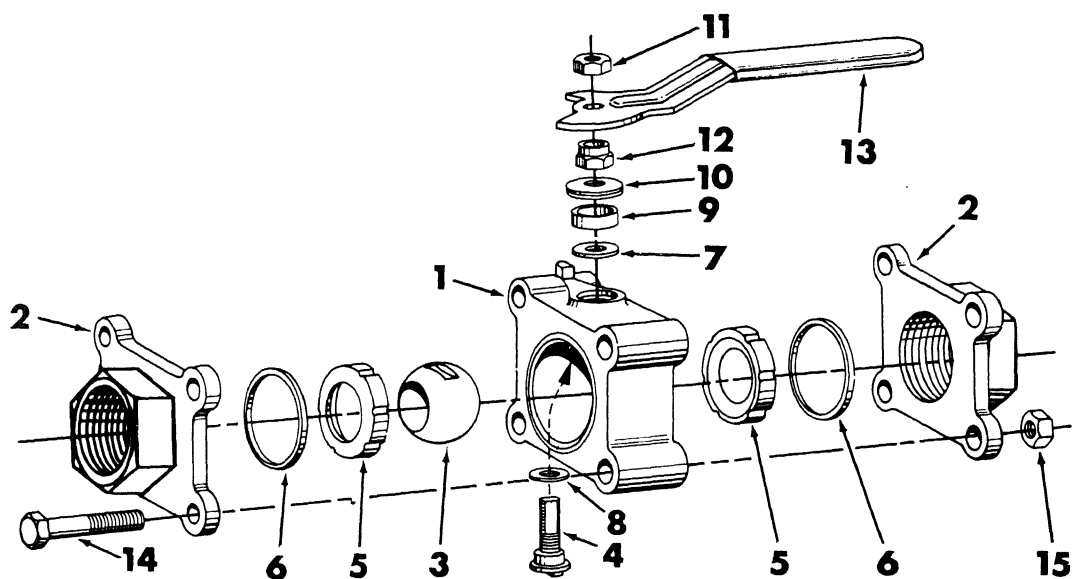
ME 4330-230-12/D-1

Figure D-1. Vessel and Skid Assembly.



ME 4330-230-12/D-2

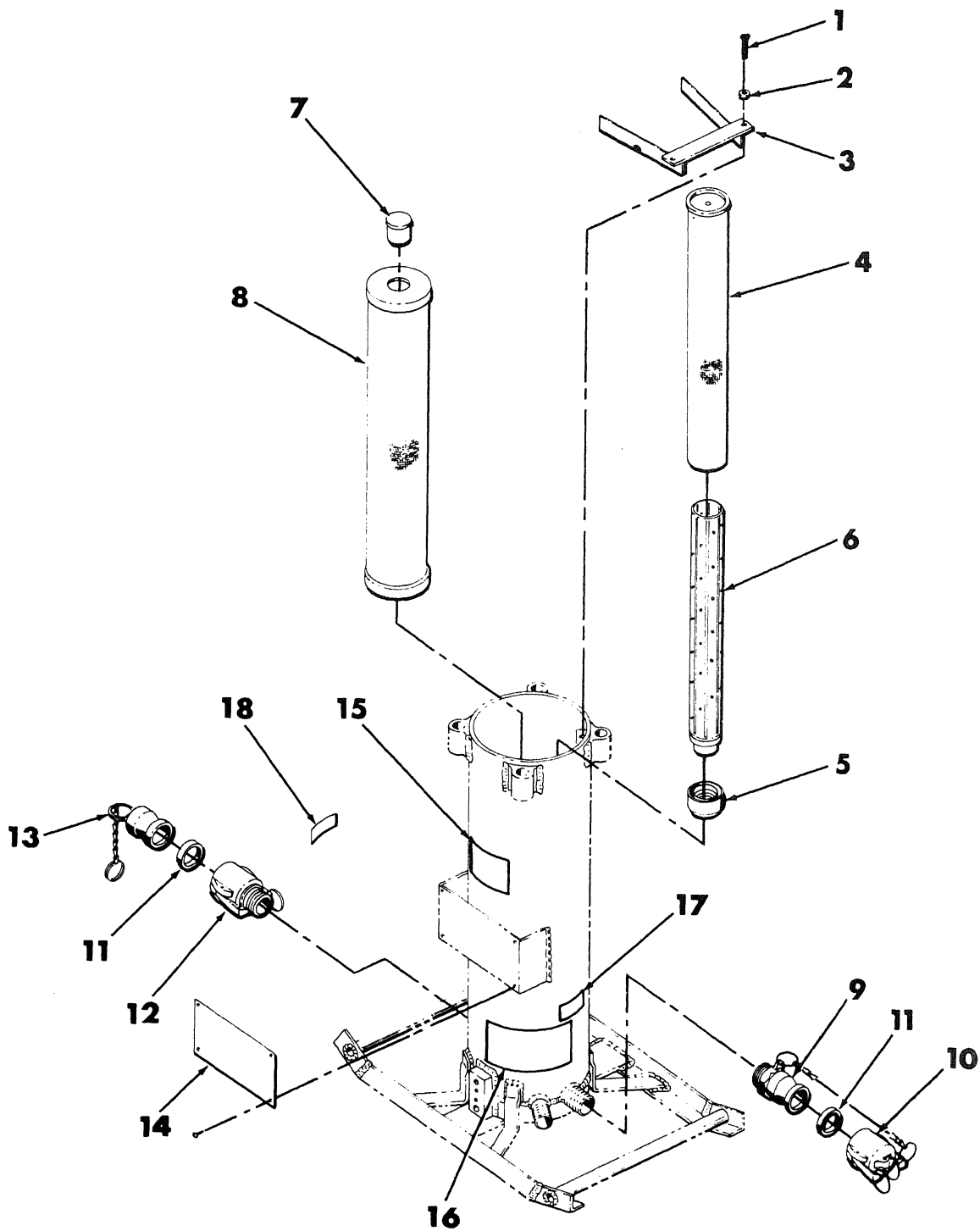
Figure D-2. Valves -- One Inch.



ME 4330-230-12/D-3

Figure D-3. Valve --One Half Inch.





ME 4330-230-12/D-4

Figure D-4. Accessories and Attaching Hardware.

# Section V. INDEX—FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS-REFERENCE TO FIGURE AND ITEM NUMBER

Stock Number	Figure No.	Item No.	Stock Number	Figure No.	Item No.
4330-197-4975	D-1	4	5310-768-0318	D-1	3
4330-197-4976	D-4	4	5310-809-5998	D-1	2
4330-197-4977	D-4	3	5310-993-8120	D-4	2
4330-983-0998	D-4	8	5325-121-8475	D-4	5
4730-929-0735	D-4	9	5330-235-4716	D-1	10
4730-929-0791	D-4	10	5330-250-0225	D-3	6
4820-407-6449	D-1	13	5330-265-1078	D-2	6
4820-407-9981	D-1	14	5330-408-4558	D-1	5
4930-360-0710	D-4	12	5330-408-9021	D-1	1
4930-360-0737	D-4	11	5340-435-5315	D-4	7
4940-360-0715	D-4	13	6680-197-4941	D-1	
5305-050-9234	D-4	1	6680-197-4942	D-1	9
5310-582-5677	D-1	7			

Reference No.	Mfg. Code	Fig. No.	Item No.	Reference No.	Mfg. Code	Fig. No.	Item No.
FF-S-92	96906	D-1	6	433T-8-2	98991	D-3	8
MS 15795-810	96906	D-1	7	433T-9-2	98991	D-3	9
MS 27022-5	96906	D-4	9	433T-1-2	98991	D-3	1
MS 27026-5	96906	D-4	12	433T-2-2	98991	D-3	2
MS 27028-5	96906	D-4	10	433T-3-2	98991	D-3	3
MS 27029-5	96906	D-4	13	433T-4-2	98991	D-3	4
MS 27030-3	96906	D-4	11	433T-5-2	98991	D-3	5
MS 27183-18	96906	D-1	2	433T-10-2	98991	D-3	10
MS 29513-20	96906	D-3	6	433T-11-2	98991	D-3	11
MS 29513-127	96906	D-2	6	433T-12-2	98991	D-3	12
MS 35338-138	96906	D-4	2	433T-13-2	98991	D-3	13
MS 51957-68	96906	D-4	1	433T-14-2	98991	D-3	14
MS 51967-14	96906	D-1	3	433T-15-2	98991	D-3	15
MIL-F-52308	81349	D-4	8	041315-04	90005	D-4	6
433T-1	98991	D-2	1	119040-7	01400	D-2	7
433T-2	98991	D-2	2	119047-7	01400	D-3	7
433T-3	98991	D-2	3	13207E9044-1	97403	D-1	13
433T-4	98991	D-2	4	13207E9044-2	97403	D-1	14
433T-5	98991	D-2	5	13216E2766	97403	D-4	17
433T-8	98991	D-2	8	13216E2767	97403	D-4	18
433T-9	98991	D-2	9	13216E2768	97403	D-4	16
433T-10	98991	D-2	10	13216E2798	97403	D-1	12
433T-11	98991	D-2	11	13217E5360	97403	D-1	
433T-12	98991	D-2	12	13217E5361	97403	D-1	8
433T-13	98991	D-2	13	13217E5362	97403	D-1	9
433T-14	98991	D-2	14	13217E5363	97403	D-1	10
433T-15	98991	D-2	15	13217E6622	97403	D-4	3
13217E6623	97403	D-4	5				
13217E6624	97403	D-1	5				
13217E6625	97403	D-1	4				
13217E6627	97403	D-4	7				
13217E6628	97403	D-1	1				
13217E6629	97403	D-4	14				
13217E6630	97403	D-1	11				
13217E6631	97403	D-4	4				
13217E6632	97403	D-4	15				

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Paragraph,  
Figure, Table,  
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By Order of the Secretary of the Army:

Official:

KENNETH G. WICKHAM,  
*Major General, United States Army,*  
*The Adjutant General.*

W. C. WESTMORELAND,  
*General, United States Army,*  
*Chief of Staff.*

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